



Crowd Management for Supermarket to Ensure Social Distancing using Android

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Abstract—this paper presents a novel method of collaborating ease in managing crowd and ensuring social distancing. This is implemented using an Android application. We are designing a new token system which is able to maintain social distancing in crowded places. This system helps us by allowing a limited number of people in supermarket by giving them a fixed time slot.

Index Terms— Android, SQLyog, Spyder, Barcode Scanner.

I. INTRODUCTION

From past 2 decades, use of mobile devices has greatly increased, that has led to ease of carrying out day to day activities. Nowadays, wireless networks have taken over the entire world. Business and financial transactions can now be done easily and securely, anywhere and anytime. Using Internet, connections can be established with any devices almost anywhere in the world and can share necessary information amongst them. In this pandemic era, everything is functioning with restrictions. People who visit supermarkets for their needs have to face the problem of standing in long queues as well as the supermarket's find it difficult to manage the crowd. When a person goes to a supermarket they tend to spend more than the required shopping time. This leads to a mismanagement of the people who are inside the supermarket as well as the ones in the queue.

A. Crowd Management

At the present time, due to covid-19 situation it is risky to leave home for any purpose. As this disease spreads rapidly from people who are in close contact with the infected person. The precautions of this disease are to maintain social distance and avoid going to crowded places like Cinema hall, Malls, Market, etc. But it is very difficult to manage crowds from these places. We are designing a new token system which is able to maintain social distancing in crowded places. This technology can help to overcome this problem. This system helps us by allowing a limited number of people in supermarket by giving them a fixed time slot. The main aim of this system is to avoid crowds by giving a fixed time slot to customers and a system that integrates alert notification via SMS to be sent to customers at the counter on given time.

B. Android



Fig. 1: Android Software Environment

Android is an operating system developed for smartphones and tablets. It is based on Linux kernel and uses Dalvik Virtual Machine (DVM) for executing Java byte code [1]. Absence of GNU C Library and some functions differentiate it from being Pure Linux. Android's source code is released by Google under open source licenses.

Some features of Android are-

- Highly customizable nature
- Reasonable Price
- High degree of ease due to presence of PC like apps.
- Hardware and Software features
- Full control over OS.

Android software environment consists of-

- Linux kernel
- Libraries and Dalvik Virtual Machine
- Application Framework
- Applications (built-in and custom)

II. LITERATURE SURVEY

In Existing systems, the old token system uses a self-help system, where customers need to visit each stores or order online [2]. Traditional shopping is a tedious and time consuming job. Although the growing trend of online shopping has reduced some load, there is still some difference in actually going to shops, and hand picking products to get the feel of their quality and features, that cannot be experienced online. Customers also feel wary to carry out online purchases due to fear of less secure transaction process that may lead to hacking of user's sensitive data, insecurity of credit/debit cards, unreliability or breach of privacy. The project aims at removing flaws of both kinds of shopping, and bridge the gap between physical and virtual world [1].

The paper assumes that the application described would be a prototype that would shape the future & there still remains much to do in terms of development and improvement of the existing models [3]. Applications created with ease of understanding and the design can be created and tailored to the shopping process to make it more effective and user friendly, thus making it easier & convenient for the users to do the entire shopping process with the use of this application [4].

III. PROPOSED WORK

In proposed system the admin of supermarket will set the limit of people in a timeframe who can book the slot. The customer will do the registration on application. Then the customer will select the desired Supermarket and will check that is there any slot available or not. If the slot is available the customer will be able to book the slot. When the customer enters the supermarket according to his allotted time slot, the entry timing would be registered. The people without the slot would follow the traditional barcode based token system. The entry time of the entire customer's irrespective of having a slot booked or using traditional token system would be stored in the database. Every customer would get (45 minutes) 35 minutes for shopping and 10 minutes for billing. Every customer would get reward points if he/she completes the shopping in the given time. The app users will get notified 10 minutes before the time gets exhausted. The supermarket would be able to track the actual number of population inside the supermarket. Thus the proposed system would help in the proper queue management.

A. Web Service

A Web service is software which can connect any device that is active in the internet to another and establish communication between them. It uses HTTP as common communication protocol. Web service is required to terminate the shopping session and move further to complete the transaction.

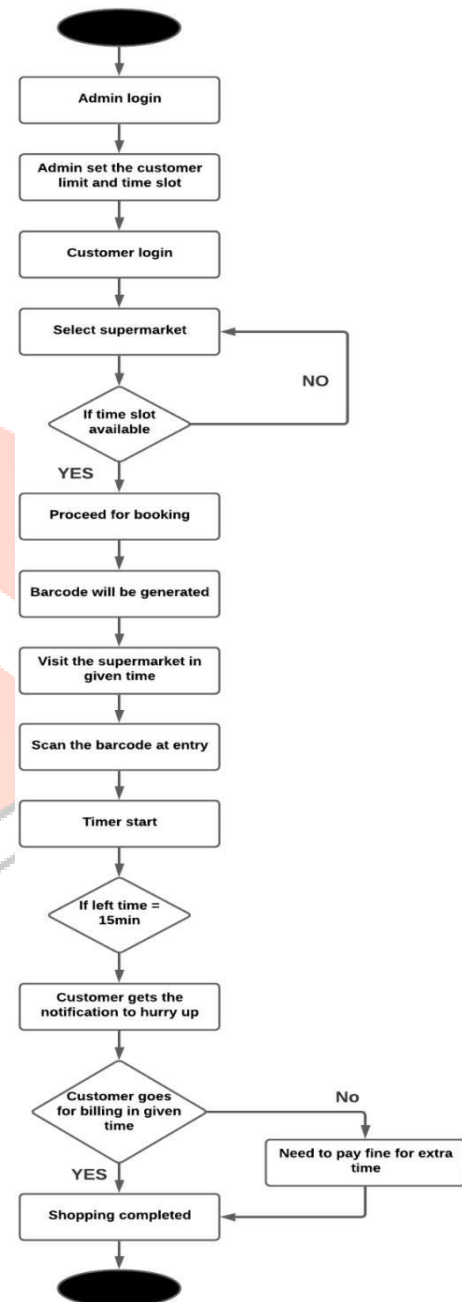


Fig. 2: Flow Chart

B. Database

The supermarket's database is designed using SQLyog. It is a GUI tool for the RDBMS MySQL.

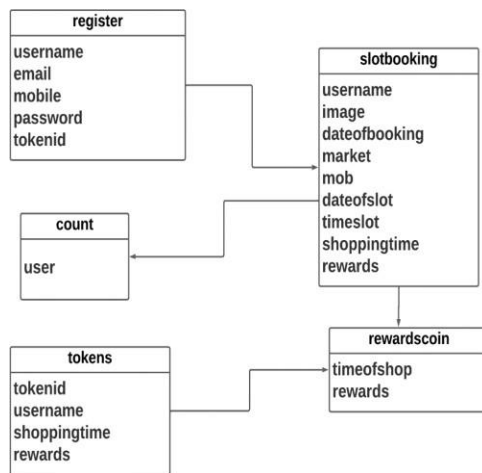


Fig. 3: Schema of the database

In above diagram, the architecture of our database system is explained. We used this all tables for handling the user queries. We store the user data in this tables. We use register table for storing the user details at the time of registration and for authentication of user. At the time of slot booking, table will used. All the details of user and QR code image will stored in this table. And time will continuously updated in this table. And count will increment in count table. All the offline users data will stored in tokens tables. And after terminating session the reward will updated in rewards coin table.

IV. IMPLEMENTATION DETAILS

A. Application Features

The system has following features-

- This system will result in reducing the customer's waiting time in the queue.
- Hassle free crowd management.
- Ensures social distancing.
- Boost in earnings of the supermarket.
- First, there is no need to stand in the queue for a long time in supermarkets just for entering.
- The system keeps track of the number of people using the app inside the supermarket.

B. Technologies Used

- Android SDK
- ADT (Android Development Tool)
- SQLyog
- Python
- Flask

Android SDK- It is the software development kit used for developing android apps. This kit includes-

- Debugger
- Libraries
- Quick emulator
- Documentation
- Sample code
- Tutorials

Android virtual device is used to get a view of an app. This SDK will be included in the android in the bundle called as ADT bundle. This ADT bundle is then extracted to get the above facilities.

Android Development Tool- It is the plugin for the eclipse with the help of which following tasks can be performed-

- Set up new Android projects
- Creating a new application UI

In total it provides an environment in which the android projects can be imported, build and run successfully.

SQLyog- It is a GUI tool to manage MySQL and Maria DB servers and databases in physical, virtual, and cloud environments. DBAs, developers, and database architects alike, use SQLyog to visually compare, optimize, and document schemas.

Python- Python is a high-level, general-purpose programming language. Its design philosophy emphasizes code readability with the use of significant indentation. Its language constructs and object-oriented approach aim to help programmers write clear, logical code for small- and large-scale projects. Python is dynamically-typed and garbage-collected. It supports multiple programming paradigms, including structured (particularly procedural), object-oriented and functional programming. It is often described as a "batteries included" language due to its comprehensive standard library.

Flask- Flask is a micro web framework written in Python. It is classified as a micro framework because it does not require particular tools or libraries. It has no database abstraction layer, form validation, or any other components where pre-existing third-party libraries provide common functions. However, Flask supports extensions that can add application features as if they were implemented in Flask itself. Extensions exist for object-relational mappers, form validation, and upload handling, various open authentication technologies and several common framework related tools.

A login window from where users as well as admin can login into their respective accounts and continue with the further process.

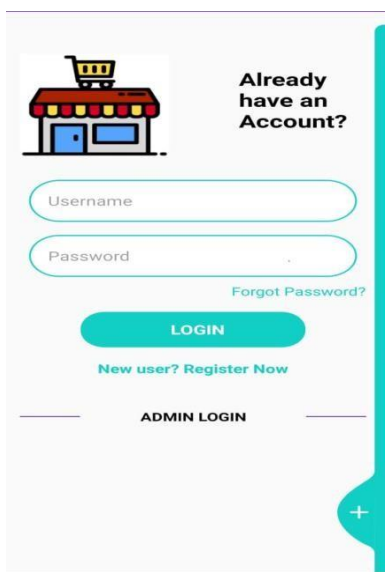


Fig. 4: Snapshot of the login window

A barcode is generated which is scanned at the entrance of the supermarket.

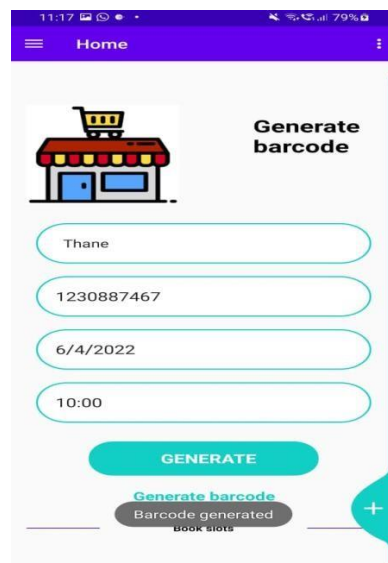


Fig. 6: Snapshot of the barcode generation

A fragment is a portion of the user interface in an activity of an android. Navigation drawer is the facility in which there is a transition from the left edge. In this app, it shows all the app's main options for the navigation.

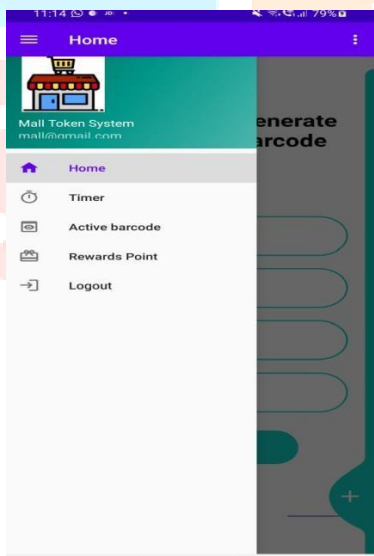


Fig. 5: Snapshot of the Navigation drawer

Admin scans the barcode the count of the people in the supermarket is incremented.

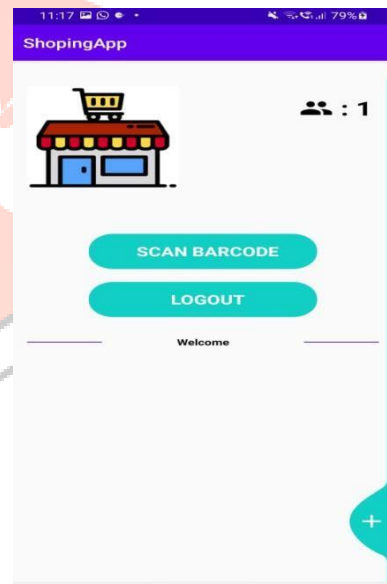


Fig. 7: Snapshot of the admin profile

V. RESULT

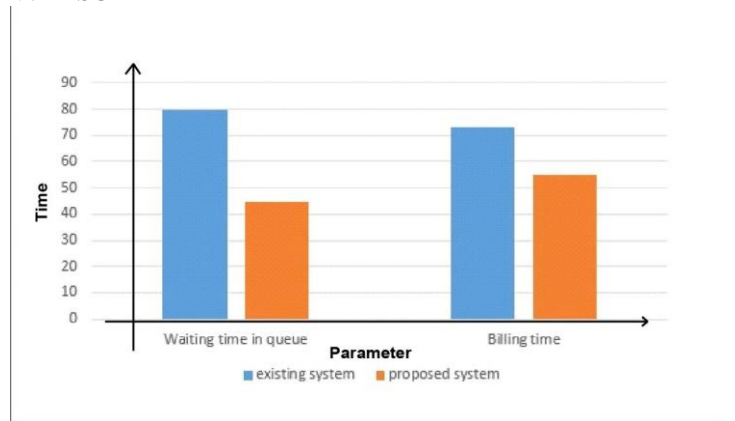


Fig. 8: Graph comparing waiting time and Billing time in existing system and proposed system

In above graph x axis contains waiting time in queue and billing time and y axis contains score. So we compare existing system with proposed system based on these parameters. As we can see if we compare both system with output parameter then proposed system is much better than existing system. Processing time is more important parameter. When we run whole system that takes time to generate final output and that time is important to compare with existing model, and as we can see that existing model time is less than proposed model.

V. CONCLUSION

Supermarkets are widely used by people for their daily grocery shopping where people can have access to all their basic daily needs at a place which they need to visit frequently. Currently, the supermarkets are functioning on the policy of poor assumption when it comes to managing crowd inside and outside the supermarket which may violate the social distancing norms in some cases. The features offered by our project are capable of managing the crowd in supermarket efficiently, tracking the actual number of population inside, monitoring the amount of time people spend in the supermarket. Combination of all these concepts will lead to a well-organized management of customers and would boost the overall profit of the supermarket.

VI. REFERENCES

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